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ABSTRACT

An exploratory study investigated how writers represent their task to themselves before beginning to write. Using data from verbal protocols, the initial plans of 12 writers (5 experts and 7 student writers) who were working on an expository writing task were examined. The protocols were coded for types of planning. Independent measures of the quality of the subjects' plans and of the quality of their texts were also obtained. The analysis suggest that both the quantity and quality of a writer's initial planning may make a difference in the quality of the final text. A positive correlation between the amount of initial planning and text quality, and between the quality of planning and text quality was also found. In particular, the study revealed that writers who developed rhetorical plans (i.e., plans for audience and purpose) tended to produce higher-rated texts. The data indicated that experienced writers build a rhetorical representation of their task. A rhetorical representation is defined as one which is rich in rhetorical goals and plans relating to the audience, purpose, form and language of the text, and in which the writer integrates his plans to form a coherent theory of the task. (Four tables of data are included and two appendixes containing rating instructions for texts and rating instructions for protocol excerpts are attached.) (Author/KEH)

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Center for the Study of Writing

Technical Report No. 35

DIFFERENCES IN WRITERS' INITIAL TASK REPRESENTATIONS

Linda Carey, Linda Flower, John R. Hayes,
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July, 1989

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A joint report with the Carnegie Mellon Planning Project (ONR).

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ABSTRACT

This exploratory study investigates how writers represent their task to themselves before beginning to write. Using data from verbal protocols, we examine the initial plans of twelve writers (five experts and seven student writers) who were working on an expository writing task. The protocols were coded for types of planning. We also obtained independent measures of the quality of the subjects' plans and of the quality of their texts.

The analysis suggests that both the quantity and quality of a writer's initial planning may make a difference in the quality of the final text. We found a positive correlation between the amount of initial planning and text quality, and between the quality of planning and text quality. In particular, we found that writers who developed rhetorical plans (i.e., plans for audience and purpose) tended to produce higher-rated texts. From our analysis, we hypothesize that experienced writers build a rhetorical representation of their task. We defined a rhetorical representation as one which is rich in rhetorical goals and plans relating to the audience, purpose, form and language of the text, and in which the writer integrates his plans to form a coherent theory of the task.

I. INTRODUCTION

Writing problems fall into the general class of problems characterized by Reitman (1964) and Simon (1973) as "ill-structured" problems, analogous to problems faced by architects, designers or composers. In contrast to "well-structured" problems (e.g., games, or toy tasks) where the goals, operators and knowledge required for solving the problem are specified for solvers by the task instructions, ill-defined problems require solvers to define their own "problem space" as they work (Simon, 1973). Dealing with an ill-structured problem, then, requires problem-solvers to take an active role in delimiting and defining the boundaries of their task, and more specifically to:

- Build their own unique representation of their task in response to some general (and often vague) task specifications--e.g., "compose a fugue," "write about your job."

- Specify their own goals and criteria for the task and develop their own tests for evaluating possible solutions.

While falling within the general category of ill-defined problems, writing tasks may vary in the amount of structure imposed by the task instructions. In some tasks, like writing a computer manual to tight specifications, some constraints (such as format and style) may be given to the writer. In many others, however, writers are given a "clean slate" to define their own goals and criteria. In such cases, a writer is faced with a myriad of choices: there may be many possible ways to represent the task and problem and many possible solutions--i.e., types of text that might be produced. The choices that writers make (or do not make) in terms of goals, constraints (such as genre) and criteria provide a self-imposed structure to the task and guide their search for possible solutions; writers can only accomplish the tasks which they set themselves (Flower et al., 1987).

How then do writers represent their tasks to themselves? What are the features of their representations and what individual differences might we find? Here, we will report the results of an exploratory study of the initial task representations of twelve writers (with varying amounts of writing expertise) for a complex writing task. [This research was part of a major study of experts' and novices' planning processes in which we develop a theory of the planning process and examine writers' goals and plans before and during composing. See Flower et al., 1987; Hayes, 1987]. Before discussing our study of initial task representation in depth, let us look at some findings from other domains which provide some working hypotheses about the nature of and differences in problem-solvers' representations of their task.

Research in other knowledge-rich domains points to some important differences between experts' and novices' problem representations. For a case in point, let us examine solvers' representations of problems in physics. Although physics can be classified as a "formal domain" (Larkin, 1983) where the goals and operators are more well-defined than in most writing tasks, we can see some important analogies with writing: there are several possible problem representations that solvers may develop, and the choice of representation greatly affects both the efficiency of their search for a solution and the quality of that solution. For example, Larkin (1983) and Larkin, McDermott, Simon & Simon (1980) found that physics experts build representations of physics problems which are qualitatively

different from those of physics novices. First, the experts built "elaborated" representations which contained a large amount of domain knowledge; second, their representations were based on an inter-related set of physics principles which Simon and Simon (1978) term "physical intuition." In contrast the novices' representations were much more spare and were based on formulae for solving the problem rather than on physical principles and concepts. As a result, the novices often picked up on cues in the task instructions and jumped straight into the problem without conceptualizing it; sometimes they were mistaken in their choice of formula, and because they did not represent the problem on a more fundamental level, they were unable to proceed to a solution.

This research on physics solvers suggests some interesting questions about writers' initial task representations:

- Do writers' task representations also show qualitative differences depending on the writer's expertise and experience? How can we characterize these differences?

- Do expert writers build enriched task representations based on rhetorical principles and relationships--in essence, representations based on what we might term "rhetorical intuition"?

- If so, do such "rhetorical representations" function in a similar way to experts' "physical representations"--that is, to allow expert writers to structure their task in a way conducive to a successful solution?

We envisage that a rhetorical representation may provide an expert writer with an overall framework for his or her planning process. Thus effective writers may develop plans which encompass important rhetorical concepts which they instantiate with goals and plans unique to the task at hand. That is, such a rhetorical representation would call for the writer to include goals and plans not only for the content of the text, but also for its organization, for its overall focus, and for meeting the needs of its particular audience *and* to integrate these components. Thus we would expect to see a writer planning a text around these goals and embedding content within a purpose.

This kind of rhetorical representation requires more than a "fill in the blank" approach to a writing task. Each new task requires writers to instantiate their top-level goals (e.g., to meet the needs of the reader) in a different way. If the subject is complex and new, writers may not have available pre-packaged or organized pieces of information which can be simply slotted into the text. Rather, they will have to engage in difficult knowledge transforming operations to adapt what they know to meet their rhetorical goals (Scardamalia & Bereiter, in press). We would certainly expect more experienced writers to be more adept at this difficult manipulation of content and rhetorical knowledge. For example, in a study of young writers, Burtis et al. (1983) found that their subjects' plans consisted overwhelmingly of plans for content and that, even when provided with cues for more rhetorically oriented planning, the subjects still produced plans for specific content or for actual text.

Our analysis has led us to identify five key features of a rhetorical task representation. We hypothesize that writers who engage in initial rhetorical planning develop plans in the following categories. (The examples presented here are from verbal protocols collected from writers working on our experimental task--to write about their job for the teenage magazine, *Seventeen*. We discuss our

task, subjects and procedures more fully in the methodology section of this report. We also present some extended episodes from our verbal protocols, with an analysis of their planning statements, later in the report--see Section III.)

- Content: What information will the writer include in this text?

  e.g. So maybe I could write about a college student preparing for my major or a job which would be public policy and management

- Form: How will the writer organize and structure this information? What genre or format will he or she use?

  e.g. What about a sequence. Reads papers, makes up assignments, writes--so forth. I want to start with what they think is obvious

- Audience: How does the writer represent the audience (for example, their characteristics, attitudes, interests etc.)?

  e.g. Young female teenage audience. They will have had English--audience--they're in school

- Theme: How does the writer represent the overall focus or rhetorical purpose of the text? Does the writer have a unifying idea around which other ideas are developed?

  e.g. In fact that might be a useful thing to focus on. How a teacher differs from a professor and I see myself as a teacher

- Other goals: What other goals does the writer set for this task? For example, what goals does the writer have for addressing the audience, for projecting his or her own persona, for the choice of language and tone?

  e.g. The tone and style at seventeen. I suppose it should be light and lively, filled with slang

What alternatives to a rhetorical representations might a writer use? First, inexperienced writers may organize their writing tasks around content rather than rhetorical features; that is, they set themselves the goal to "tell all they know" about a topic rather than to adapt or transform their knowledge to meet the rhetorical constraints of audience and purpose (Scardamalia & Bereiter, 1982; Scardamalia & Bereiter, in press). This "knowledge-telling" strategy may be a useful way for young writers to express their thoughts, but it is clearly inappropriate for complex writing tasks. This distinction is similar to that (for adult writers) made by Kern et al. (1977) between topic-oriented writing and performance-oriented writing; as Kern's study indicates, where a text will be used to facilitate action or decision-making (for example, instructions for operating a machine or policy guidelines), topic-oriented writing will not meet the needs of the user/reader.

Second, as we noted earlier, not all writing tasks may require a sophisticated rhetorical task representation. For example, take the case of a journalist writing a news story. In such a highly structured genre, a standard format--for example, the "inverted pyramid" which requires an ordering of information according to importance--provides a ready-made set of genre-specific goals, constraints and criteria for the task (Schumacher, Klare and Scott, 1985). In such tasks, expert writers may not need to build a unique and "customized" representation of the task because they already have a well-learned, "off the shelf" script which guides and constrains their writing process. Their problem-solving efforts, then, may be directed to other cognitive activities, such as evaluating the extent to which their emerging text meets the genre constraints (Schumacher et al., 1985).

The goals of our study of initial task representation were, then:

- To investigate possible differences in the type of initial task representation our writers built. In particular, we wanted to see if our writers built rhetorically-based representations and what kind of information they included.

- To investigate whether the type and quality of the initial plans that writers make may be related to the quality of their final text; that is, whether those writers whose plans had a more rhetorical basis produced better texts.

We wanted to leave open (as far as possible) the goals, constraints and criteria for the task to enable writers to build a rhetorical representation if they were able, or if they chose, to do so. We thus chose a task which was complex and new, and which would then not lend itself to either a knowledge-telling task representation or a formula-based representation.

II. METHODOLOGY

Subjects

The subjects for this study were twelve writers with varying degrees of expertise and experience. Five were expert writing teachers and seven were student writers (four advanced students and three with identified writing difficulties).

Task

The subjects were asked to write about their job for *Seventeen Magazine*. They were told that the readers of the magazine would be teenage girls (aged thirteen or fourteen). The subjects were given an hour to complete their task, and verbal protocols were taken as they worked.

This task was ill-defined in that each writer could draw on and adapt a unique body of personal knowledge about his or her job and develop a unique set of goals to reach the young readers of the article. Clearly, there was a variety of ways of approaching this task and hence a potential for unique, adaptive solutions to a complex rhetorical problem. Our writers on this task had to do what many professionals writing to lay audiences have to do: 1) determine their own goals, including representing the audience to themselves and deciding how to meet the audience's needs; and 2) decide what information to include, given their goals. Even the topic of "their job" was open to debate and depended in part on their image of the audience and the goals they set for the essay.

Method of Analysis

1. Text Rating

The subjects' written products were rated for quality by four experienced writers who considered the following three dimensions of the essays:

- How well is the text adapted for the audience?
- To what extent does this text have a clear point, focus or rhetorical purpose that goes beyond simply "knowledge-telling" on a topic?
- How well-structured is the text in terms of overall organization and coherence?

(See Appendix A for the rating instructions.)

We chose these three criteria because they address important rhetorical features of many professional writing tasks (for example in the our task, adapting information about one's job for young readers who might not be very motivated to read on). We wanted to obtain a measure of the extent to which our writers met the *rhetorical constraints* of the task. Thus, because our criteria for judging a text as "successful" were rhetorical, rather than purely based on content, we did not explicitly ask our raters to evaluate the content of the essays in isolation from these rhetorical features. For example, consider a writer who described the technical aspects of his job as a computer technician without adapting for the audience (e.g., without explaining technical concepts and terminology) or without manifesting a clear rhetorical purpose other than "knowledge-telling"; this writer would receive a relatively low total score for text quality, even if he presented a lot of detailed and accurate information, because his text would not meet our rhetorical criteria.

2. Analysis of Planning Categories in the Protocols

For this study of initial planning, we limited our analysis of the protocols to the initial segments, which ended when the subjects wrote their first complete sentence; we did not look at any planning that they did after this point.[1] This unit of the protocols provides us with a conservative measure of the subjects' planning ability in that it *only* provides information on how our writers represented their task to themselves *before* beginning to actually generate a solution in the form of text. We argued that, although some features of their task representation may have been modified in response to evaluations of their emerging text, writers may set the boundaries of their task in this initial segment--that is, they may set their top-level goals and constraints. (The average length for this segment was 70 clause-units.) Would differences in the *nature* of the task that our writers set themselves in this initial planning account for differences in the nature of the texts they produced?

The protocols were analyzed as follows:[2]

1. The protocols were divided into clauses up to the cut-off point defined above, and clause-units were coded into the following categories: reading/paraphrasing the task instructions; process goals and comments; metacomments relating to the assignment; planning. We will focus on those statements coded as "planning."

2. These planning clauses were further broken down into the five categories which we hypothesized constitute key features or categories of planning in a rhetorical task representation: content/topic, form, audience, theme, and other goals (see discussion and examples in Section 1). Clauses which were simply repetitions of information previously stated were excluded from this analysis.

3. Rating of Planning Quality in the Protocols

In addition to rating the texts, we obtained a measure of the quality of the planning in the initial planning segments of the protocols. Two experienced writers rated the protocol excerpts on the three dimensions listed below. The raters were explicitly told to consider *quality* of planning, rather than amount of planning in these categories. (See Appendix A for the rating instructions.)

- How well does the writer's planning reflect a concern for adapting his or her text for the audience?
- To what extent does the writer's planning reflect a concern with developing a clear point, focus or rhetorical purpose for his or her text that goes beyond simply "knowledge-telling" on a topic?
- How far does the writer's planning reflect a concern with structuring the text or fitting a genre?

III. RESULTS AND DISCUSSION

Here we will look at two aspects of our subjects' planning in these initial segments of the protocols: 1) the amount of planning that the subjects engaged in before beginning to write and 2) the nature and quality of their planning. In our analysis, we categorize our subjects in several different ways:

Category	Breakdown of Subjects	
Previous writing experience:	Expert	Novice
Amount of initial planning: Based on number of planning clauses up to first sentence (median split)	Extensive Planners	Minimal Planners
Quality of final text: Based on total quality scores for text (median split)	Higher Scorers	Lower Scorers
Type of task representation: Based on % of content plans vs. rhetorical plans and categories of rhetorical plans covered	Rhetorical	Content-based

(We will discuss these categories in more detail as they arise in our analysis.)

We expected that the above four dimensions would be related--that is, that our expert writers would produce texts in the top half of the distribution of text scores (high scorers) and that they would develop extensive, rhetorical plans in their initial task representations. While two experts did fit this profile, three others did not (they were missing one or more dimensions). Similarly, not all our novices were "lower scorers"; several of them were extensive planners[3] and some did engage in rhetorical planning (though perhaps not with the sophistication of our expert rhetorical planners). These somewhat surprising results are discussed further in the sections which follow.

Amount of Initial Planning

We found a wide range in the amount of planning that the subjects engaged in before beginning to write (see Table 1). However, counter to what one might expect, the amount of initial planning did not correspond with experience. (There was not a significant difference between the number of planning statements for experts and novices by the Mann-Whitney test.) The writers who did little planning were not always the novices; for example, two of our experts (BS and IB) have only 7 and 2 planning statements respectively. Rather, we found two modes of planning[4] which cut across expertise: "extensive," where the subjects do a substantial amount of planning and "minimal," where the subjects do little, or almost no planning.

This numerical distinction also appears to reflect two distinct approaches to initial planning which we observed in the protocols. Our six minimal planners generally took an approach which can be characterized as "plunge in and write," whereas our six extensive planners did try to develop some initial plans, with varying degrees of success. To illustrate this distinction, we present below examples of the initial task representations of two of our typical "minimal" planners--one expert and one novice. Neither of these subjects did any initial planning that went beyond briefly stating the overall topic for their text, and (in the case of the novice) making brief references to the audience; both subjects made a decision to begin writing early in their composing process. The expert, in fact, consciously chose to write in order to "see what (he will) come up with"; and he subsequently only made minor changes to the draft that he began at the end of this initial episode.

Minimal Planner: Expert IB (Total planning = 2cls.)

> (Reads and paraphrases assignment). "Okay--let's see..NEH fellow. What's NEH. Okay explain NEH--going to have to do an awful lot of explaining. Don't forget the audience. Okay I'm going to try a little prewriting to see what I come up with here... NEH..um. **Alright..charge ahead here..charge ahead and see what happens.** I'm an NEH fellow at CMU-- No, job, job, my job. Let's try another tack here"
> (Begins to write a draft)

Minimal Planner: Novice FD (total planning = 11 cls.)

> (Reads assignment). "I don't know where to begin. I don't have any thoughts yet. What do they want to hear...I'm talking about these girls.. I don't see why I'm going to write different for them than I would (for) everybody else. When they say my job what do they mean? Presently or future, one you want to hold or a job you've had in the past? Maybe a job I want to have.. I work in the computer science room at CMU. That's where I want to work... **Maybe I'll take to the prose** and try to write to these

kids about what they should look for in a job. First of all, the job I want to work in is in a business-related environment of the computer science field. If possible the department of defense.. I'm going to try to write something that they're going to want to read...and just start saying I'm basically looking for a job." (Begins to write a draft)

In contrast, as we can see from Table 1, our extensive planners delayed writing a first sentence until they had worked longer on the task. All these writers were at least attempting to develop some more substantial initial plans for their text (although, there was a large variability in the number of planning clauses excluding repetitions in the initial task representations of the "extensive planners": lowest = 21; highest = 88). Let us consider the case of novice writer LR (see Table 1) who did the *least* amount of initial planning among our extensive planners (21 clauses). In comparison with the minimal planners discussed above, writer LR spent more time developing plans for the content of his essay and was thus, we would argue, at least attempting initial planning. (In Section III, we present a transcript of this writer's initial task representation and discuss his lack of success in developing many rhetorical plans--e.g., plans for audience and purpose--in more depth.)

Amount of Initial Planning and Text Quality

We found the amount of our writers' initial planning to be positively correlated with the quality of the text they produced. (See Table 2 for text scores.)[5] Overall, we found a correlation of .655 between the number of planning statements made by our writers and the total quality score for the written texts. For the experts the correlation was .694 and for the novices, .799. (These figures were computed using the Pearson product moment correlation co-efficient.) The high correlation between the novices' planning and the quality of their texts is particularly interesting. The fact that the two novices who did the least planning (MR with 4 cl. and GJ with 8 cl.) received the lowest scores for their texts and that two of the novices who did the most planning (NK with 44 cl. and SA with 38 cl.) received the highest scores for their texts (out of the novice writers) suggests that the amount of planning before beginning to write may be a good predictor of the quality of the text produced *when an inexperienced writer is facing a relatively complex task.*

We hypothesize that a key variable in predicting success on our task may have been the amount of initial planning rather than prior writing experience.[6] We found no significant differences (by the Mann-Whitney test) between the quality of the texts produced by our expert and our novice writers. Although, the difference between the quality of the texts produced by the extensive planners and by the minimal planners (see Table 2) was also not statistically significant, though it approached significance ($p = .0782$ by the Mann-Whitney test). However, the positive correlation between amount of initial planning and text quality (and especially the high correlation for novice writers of .799) does suggest a relationship which warrants further investigation.

Although these results are exploratory, they do suggest that building an initial task representation can positively affect the quality of the texts produced. The importance of planning throughout a writing task has been observed in previous studies (see Flower and Hayes, 1981). This current study suggests that *initial* planning is one aspect of the planning process which contributes to producing a successful text, particularly for inexperienced writers. This hypothesis is certainly consistent with findings from other domains (such as physics) where novices' difficulties often result from a lack of time spent conceptualizing the problem before beginning to work. The correlation between amount of initial planning and text

quality for our experts is more surprising, however. We might expect that experienced writers would produce a successful text with little or no initial planning because they could draw on well-developed schemas or familiar genres to set their initial goals. However, as we noted earlier, only one of our expert writers who did "minimal" initial planning received a score in the top-half of the distribution of text quality scores (see Table 2; expert BS). One explanation may lie in the ill-defined nature of our task which demanded a unique and adaptive set of top-level goals.

The Quality and Nature of the Initial Task Representations

We felt that quantity of initial planning alone was too gross a measure of a writer's ability to build an effective initial task representation; we were also concerned with the *quality* of the information in these initial planning episodes. Thus, in addition to obtaining ratings on the quality of our subjects' final texts, we also obtained judgments from different raters on the quality of their initial plans (up to their generation of a first sentence). That is, the raters looked at the quality of the planning statements that writers made during the initial segment of the protocol in terms of whether the subjects made appropriate plans for addressing the audience, whether they developed a clear overall rhetorical purpose and whether they developed a clear, coherent structure. Note that here the raters were not asked to consider the amount of planning, but the nature of the rhetorical information in a subjects' plans. The ratings for quality of planning[7] are presented in Table 3.

We found no significant expert/novice difference in the quality of the planning; however, those writers who did more planning (that is, the "extensive" planners) obtained significantly higher total quality scores for their planning than did the "minimal" planners ($p = .0374$ by the Mann-Whitney test). Although we were measuring quality of planning rather than quantity, it is not very surprising that in most cases the extensive planners received higher quality scores than the minimal planners simply because they elaborated on their goals more fully; however, it is interesting to note that two extensive planners (expert KC and novice LR; see Table 3) did receive quality scores at or below the median quality score, which suggests that although they did some extended planning, their plans were not very rich in rhetorical information.

An interesting result of this analysis was the very high positive correlation between the quality of the planning and the quality of the final texts (.874 by the Pearson product moment correlation co-efficient). Thus the writers who were judged by one set of raters to have the plans most rich in information were judged independently, by a different set of raters, to have the best texts. This result suggests that the type and quality of a writer's planning may well influence the quality of the text that he or she produces. The sub-scores for quality of planning for the audience, purpose and structure showed a positive correlation with the sub-scores for these dimensions of text quality as follows: audience = .778; purpose = .741; structure = .489. It would seem from these results, then, that concern with audience and purpose in planning a text may well result in texts which are better on these two dimensions.

Taken along with the strong correlation between *quantity* of planning and text quality discussed in the previous section, this relationship between *quality* of initial planning and text quality suggests that, for many writers, the planning which goes into building an initial representation of the task pays off. Although this hypothesis requires further testing, we feel that this exploratory analysis at least underscores the importance for writers of what we have termed initial "constructive planning."

Types of Initial Planning

Why does planning seem to help the quality of the texts produced? In looking for evidence of the "rhetorical planning" discussed earlier, we found differences in the kinds of information embedded in the planning statements. Table 4 shows the types of planning information[8] generated by higher and lower scorers. (The scores are based on quality scores for the text; see Table 2.) Some writers whom we had designated as "experts" because they were writing teachers received relatively low scores for their texts and were thus placed in the "low scorers" category for this analysis; conversely some student writers, originally designated as "novices," received scores in the top half of the distribution of scores.[9] One explanation for this seemingly anomalous result may be that some of the student writers were more easily able to relate to the interests of their young readers and thus produced more engaging texts than some of the writing teachers.

First, we looked at whether our writers focused on topic (content) planning or on the more rhetorical aspects of planning, such as audience and purpose. We found that in terms of absolute numbers our higher scorers simply did more planning in all categories, and particularly in the topic category (high scorers' total topic planning statements = 159; low scorers = 47). Although the difference in the number of planning statements for high and low scorers was not statistically significant, we did find a positive correlation between the absolute number of topic planning statements and text quality ($r = .654$). This result is not particularly surprising, given the fact that four out of the six high-scorers were also extensive planners, and that two subjects in this group (WS and BJ) each did twice as much initial planning than any other subject.

More surprisingly, when we looked at the *proportion* of content plans in relation to rhetorical plans, we found that, regardless of whether a writer was a student or a teacher, the higher scorers[10] had a lower percentage (58.67%) of topic plans than the lower scorers (67.14%).[11] In fact, we found a *negative correlation* between the percentage of content planning and the total quality score and sub-scores for the final text ($r = -.366$ for total score; $r = -.488$ for audience score; $r = -.398$ for purpose score). While these results are by no means conclusive, the inverse relationship between the proportion of content planning and text quality may indicate that writers may be focusing on planning specific content, and missing and/or ignoring important rhetorical goals and constraints, such as adapting a text for an audience. For example, the two writers who received the lowest overall scores and the lowest scores for audience and purpose (MR and GJ; see Table 2) wrote texts which described the technical aspects of their jobs in some detail, but which were not geared to the young female teenage audience specified in the assignment.

These differences may suggest some overall differences in the type of initial task representations that our writers were building. The fact that the "lower scorers" on our task placed greater emphasis on content plans may suggest that at least some of them were building a type of "knowledge-telling" or topic-oriented representation of their task which ignored the rhetorical constraints of the assignment. In a task that called for planning to meet the needs of the audience, some of these writers seem not to be developing many rhetorical goals. In contrast, while the "higher scorers" do devote about half of their planning to content, they are clearly placing more emphasis on developing rhetorical features--or building a "rhetorical representation" of their task.

Second, as Table 4 indicates, we found that all the higher scoring writers developed plans in all four rhetorical categories--i.e., theme, form, audience and

other goals--as well as topic plans in their initial task representation. In contrast, only one of the lower scoring writers covered all these categories (and he was a writing teacher); the others ignored one or more categories and the two writers who received the lowest text scores ignored several categories. The differences between the scores of the writers who covered all categories in their initial planning and those who ignored one or more categories was significant by the Mann-Whitney test ($p = .0149$). Furthermore, several of the writers with low quality scores failed to include plans for a "theme" or focus for the text. We found that those writers who included plans in the "theme" category received significantly higher scores for purpose/theme on their final texts ($p = .0185$ by the Mann-Whitney test).

Thus we found that the writers who produced the best texts at least "touched base" with key rhetorical features, even if like expert BS, they did little initial planning. The four least successful novices (i.e., those writers with the lowest scores for their texts) demonstrated a lack of concern for rhetorical features, either because they did not have the rhetorical knowledge to deal with audience, form etc. or because they did not realize that they should do so. This question of whether some writers fail to plan rhetorically because they do not have sufficient knowledge or because they do not think to apply their rhetorical knowledge will be addressed in a further study.

For a closer look at the nature of the information in our writers' initial task representation, we will look at some examples in depth. Below are two planning episodes from the beginning of the protocol of one of our more successful expert "extensive" planners (WS), whose text was rated highest. Although these episodes cover only about a fifth of the task representation he builds before beginning to write, they do illustrate some important features of his planning process. We include the actual protocol and an analysis of the subject's planning process.

Writer WS: extensive planner; "higher scorer on text"; expert writing teacher

Clause #		**Analysis**
Episode 1		
16	Job--English teacher rather than professor	**Topic**
.		
18	In fact that might be a useful thing to to focus on	**Theme** Defines focus of text
19	...how a teacher differs from a professor	
20	and I see myself as a teacher	
21	That might help my audience to reconsider their notion of what an English teacher does	**Goal/theme** Sets top-level goal
.		
23	(Reads) young female teenage audience	
24	They will all have had English	**Audience** Represents relevant background of reader
25	Audience--they're all in school	
26	They're taking English	
27	For many of them English may be a favorite subject	
.		
29	But for the wrong reasons--some of then may have the wrong reasons in that English is good	**Audience** Represents attitudes

30 Because it's tidy
31 Can be a neat tidy little girl
32 Others turned off because it seems too prim
33 By God, I can change that notion for them — **Goal/theme**

Episode 3

45 All right I'm an English teacher

47 I know they are not going to be to be disposed to hear what I'm saying — **Audience** Represents attitudes

48 Partly for that reason and partly to put them in the right--the kind of frame of mind I want — **Goal** (Prepare audience)
49 I want to open with an implied question or a direct one — **Form**
50 and put them in the middle of some situation — Develops skeleton structure for text
51 then expand from there to talk about my job more generally

52 and try to tie it in with their interest — **Goal** (Involve audience)

53 So one question is where to begin — **Form**
54 Start in the middle of--probably the first day of class — Plans introduction
55 They'd be interested
56 They'd probably clue into that easily — **Audience**
57 because they would identify with the first days of school — Represents a shared reference
58 and my first days are raucous affairs
59 It would immediately shake 'em up — **Goal**
60 and get them to think in a different context — Develops specific audience goals for introduction

62 Maybe first 101 class with that crazy skit I put on — **Topic** Elaborates text plan

63 That's probably better than 305
64 because 101 is freshmen — **Audience**
65 and that's nearer to their level
66 and that skit was crazy
67 and it worked beautifully
68 Okay--let's see before I write that — **Process goal**
69 I think I'll give myself some notion of where I'm heading

(Continues to plan up to clause #135 when he ties out a first sentence which he rejects. Initial task representation continues to clause #201 when he comes up with a first sentence which he keeps)

What features do we see in these excerpts which would lend support to our hypothesis that experts build a rhetorical task representation?

First, this writer's task representation is **rich in rhetorical information.** In these episodes he develops plans and goals in all the categories that we hypothesized are key features of a rhetorical task representation. Not only does he develop plans for specific content to include in his text, but he also develops a theme, a partial structure, a quite detailed representation of his audience and a set of task-specific goals. For example, he develops a representation of the audience which includes their background (they take English in school and may enjoy it) and their attitudes (they are not going to be disposed to hear what I'm saying). From this representation he develops a set of goals for his audience--to "shake them up and get them to think in a different context" (clauses 59/60).

Second, the goals that he generates provide an **integrated rhetorical framework** for his planning. Instead of piecemeal idea generation or brainstorming, we see this writer generating and organizing content to meet his particular persuasive purpose. For example, he starts out with a scenario which will put the audience in the right frame of mind and which will help them to think about English teaching in a different context. His text plans are thus adapted to fit with his guiding focus. In addition, many of his goals interact with each other and two goals may be instantiated by a single text plan. For example, he comes up with the idea to talk about his first day of class *because* this would further his goal to shake up his audience *and because* this would be something his readers could identify with. Thus this one text plan instantiates two of his important goals.

In sum, this writer is generating a set of goals and plans which make this task uniquely his own. While the task instructions provide him with some loosely defined goals and constraints (the topic, the genre and the audience), he uses the umbrella of his rhetorical representation to adapt, elaborate and instantiate these goals. The task that he ends up doing is very much a task that he himself has created and a task which results from a coherent theory based on rhetorical principles and concepts.

How does this expert's task representation differ from that of one of the less successful writers? Below are some early protocol episodes from one of our less successful student writers, whose text was rated eighth out of twelve.

Writer LR: extensive planner; "lower scorer on text"; novice writer

Clause #	**Analysis**
Episode 1	
6 I'm going to assume here I'm an engineer	**Topic** Defines subject matter of text
.	
8 I guess a research--a research engineer	
.	**Topic** (to the end of Episode I) Explores aspects of job
10 However, there's a graduate student	
11 because I'm a graduate student	
12 So ...really my job is I'm going to school	
13 Let's see--I'm a graduate student	
14 and I'm an engineer	
15 and I'm a research engineer	

16 So everything is there
17 So maybe I should explain here instead
is that I'm a graduate student pursuing
a Ph.D. in engineering

20 I do research work

22 I teach a course

Episode 2

24 (Reads) for a thirteen to fourteen teenage
audience
25 So we have to address the fact that this
girl is seventh or eighth

Audience

27 Okay so these are all the things going
through my head relative to engineering
--research engineering
28 These are all the things I'm supposedly doing
29 and I'm pursuing a Ph.D.
30 Working on a thesis

Topic
Reviews possible
details to include

32 My job here is wrong, the way I'm
interpreting my job

34 The way I'm interpreting my job means what
I'm doing with my life at this moment
in time

Topic
Re-defines topic

Episode 3

37 For the girl is approximately in seventh
or eighth grade
38 ...the assignment has to appeal to a broad
range in intellect
39 It must explain simply what I am doing

Goals
Sets general
audience goals

43 I have to generate an essay
44 We'll assume it's about two pages

Form
Specifies genre
and length.

48 That's not really hard
49 I really have my first line
50 so I'm going to rip off the page here
52 I think I can write this out very quickly.

Process

(Tries out first sentence at clause #53 which he rejects;
generates first sentence which he keeps at clause #66)

This novice's task representation looks different from the
expert's in several ways:

First the subject generates **few rhetorical goals** in contrast to the expert's rich rhetorical planning. Rather most of the planning is related to features of the topic--e.g., the main aspects of his job as a graduate student in engineering and whether being a researcher is in fact his job. He includes no goals for an overall theme or focus to the text; little information about organization beyond a very general sense of the genre and the length; almost no information on his audience's interests or characteristics, beyond that provided in the task instructions; and no goals for the text beyond a rather vague sense that he should "appeal to a broad range in intellect" and that the text "must explain simply what (he is) doing" (Clauses 38/39).

The very general rhetorical goals that he does come up with (e.g., address the fact that this girl is in the 7th or 8th grade) are not further instantiated with sub-goals and text plans and he is unable to build upon them.

Second, we do not see the integrated overall framework to guide his planning process. His planning seems to be **generated haphazardly** by features of the content with which he is struggling (i.e., a definition of his job), rather than integrated around rhetorical features. Unable to transform his content to meet the constraints of the assignment and unable to build his own unique set of rhetorical goals for his task, this writer has little option but to "knowledge tell." His text reflects this limitation as he produces a rather dry description of energy research which our raters judged to be low in meeting the needs of the audience. (See Table 2 for text scores.)

In sum, this writer's planning does not allow him to develop a rhetorical focus; eventually, after struggling for some time with his topic knowledge, he simply plunges into writing the text, letting his topic information drive his planning and generating process. Although he does plan more extensively than many of our other subjects, his plans do not help him to carve out a very appropriate and effective representation of his task.

Although we can see limitations in this novice writer's task representation, he does produce a text which was rated higher than those of two of our novices whom we characterized as "minimal" planners. These writers (MR and GJ; see Tables 1 and 4) in fact did almost no initial planning at all and simply plunged into writing immediately. As Table 4 indicates, these subjects' plans were mainly limited to content plans, which amounted to a very brief description of their job. Lacking any rhetorical goals, these writers had little choice but to knowledge tell, a strategy which is reflected by their low scores for audience and purpose on their written texts.

IV. SUMMARY AND CONCLUSIONS

This exploratory analysis of our writers' initial protocol episodes suggests that both the quantity and quality of a writer's initial planning may make a surprisingly large difference in the quality of the final text, in particular for writing tasks where the overall goals are only loosely specified (such as our experimental task). More specifically, our analysis has resulted in several hypotheses:

- Writers vary greatly in the amount of planning they do before beginning to write. Expert writers do not necessarily do more initial planning than novice writers.
    - There was no significant expert/novice difference in the amount of initial planning.
- The *quantity* of planning that a writer does before writing may effect the quality of the text he or she produces: the more initial planning, the better the final text. In general, "minimal" planners are likely to produce worse texts than "extensive" planners, particularly in the case of inexperienced writers.
    - We found a positive correlation between amount of planning and text quality: r = .665, all subjects; r = .694, experts; r = .799, novices.
    - Although we found no significant difference at the .05 level between the total scores of our extensive and minimal planners (p = .0782), we believe that this hypothesis warrants further testing with more subjects.
- The *quality* of a writer's initial planning (in particular, planning to meet the needs of the audience, to develop a purpose and a structure) may well affect the quality of the writer's text. Plans for the audience and purpose are better predictors of success than plans for structure.
    - We found a strong positive correlation between quality of our writers' initial planning and the total quality scores for their texts (r = .874).
    - We found a strong positive correlation between: 1) quality of audience plans and appropriateness of the text for the audience (r = .778); and 2) between quality of plans for purpose and purpose score for the text (r = .741). The correlation between quality of plans for structure and text score for structure was somewhat lower (r = .489).
- Writers who produce successful texts appear to do proportionately less "content planning" in their initial task representation, than do those who produce less successful texts; conversely, more successful writers' initial plans contain proportionately more rhetorical goals for audience, theme, form and for features such as tone and style. However, "better" writers may do more content planning in terms of absolute numbers because they are more likely to do more planning of all types--i.e., be "extensive planners." Our results, while by no means conclusive, suggest that less successful writers' emphasis on "content planning" (as opposed to rhetorical planning) results in texts which are less well adapted to the audience and which do not manifest a clear rhetorical purpose or organizational structure--that is, texts weaker on rhetorical as opposed to content features.

- We found that our higher scorers did more content planning in terms of absolute numbers (159 cls. as compared with 47 cls.), though this difference was not significant. There was a positive correlation between number of content plans and text quality ($r = .654$). (This is explained by the fact that four out of six of our high scorers were extensive planners, and two did twice as much planning (each) than any other subject).

- We found that those writers whose texts received scores in the top half of the distribution of final scores had a lower *percentage* (58.67%) of content planning than did those writers whose scores fell in the lower half of the distribution (67.14%). Although these figures were not statistically significant ($p = .0631$), we believe that this difference is sufficiently large to warrant further investigation.

- We also found a *negative* correlation between the percentage of content planning and the quality scores for the final text: $r = -.366$, total score; $r = -.488$, audience; $r = -.398$ purpose.

- Writers who produce more successful texts are likely to plan in all the rhetorical categories discussed earlier when building their initial task representation, whereas writers with less successful texts are likely to ignore some categories.

  - We found that the differences between the text scores of the writers with plans in all our rhetorical categories and those with one or more categories missing was significant ($p = .0149$).

  - Those writers who included plans for a theme or focus for their text received significantly higher scores than those who did not ($p = .0185$).

- Writers who produce more successful texts (in our case, not necessarily the expert writing teachers) build a *rhetorical representation* of their task which functions as a coherent theory of the task. Less successful writers often do not (or perhaps cannot) build a rhetorical representation of their task and may be left with an ineffective knowledge-telling strategy which ignores many of the goals and constraints of the assignment. We defined rhetorical representations to be:

  - rich in rhetorical goals--all the rhetorical categories of planning are covered,

  - integrated within a rhetorical framework, and

  - unique for the particular task at hand.

This exploratory study has highlighted the importance of initial planning as a possible predictor of text quality. The more successful writers simply did more initial planning, and they did a qualitatively different kind of planning with an emphasis on rhetorical features. We are currently developing studies to further investigate these differences and to address some issues raised by this study. For example, are novice

writers *unable* to develop extensive initial plans and to plan rhetorically because they lack the knowledge to do so, or is their apparent failure a matter of executive control--i.e., are they failing to plan because they do not prompt themselves (or "think") to do so? Certainly research on young writers' cognitive processes (Bereiter and Scardamalia, 1982) indicates that failure of executive control is a major stumbling block for many developing writers. Our follow-up study presents student writers with a series of prompts designed to elicit "expert planning" behavior and should provide some further insights into a theory of expert and novice planning strategies.

FOOTNOTES

[1] We defined the "first sentence" as the first sentence which the writer built upon to generate a draft or a partial draft (even if that draft was changed later). Thus sentences generated and immediately abandoned were not taken as a "first sentence" but as a note.

[2] See Appendix B for a more detailed explanation of this coding scheme.

[3] We should note here that because *seven* out of our twelve subjects were novices we would, of course, expect one novice to obtain a text score above the median and to fall into our extensive planning category. In fact *three* novices received text scores in the top half of the distribution of scores and *three* were classified as "extensive" planners.

[4] We used to median split on the total number of planning clauses (excluding repetitions) in the initial segments of our subjects' protocols (i.e., up to their generation of a first sentence) to distinguish these two "modes" of planning. Extensive planners were those in the top-half of the distribution of the number of planning clauses; minimal planners were those in the lower half of the distribution. (See Table 1.)

[5] The scores in Table 2 represent the sums of the scores arrived at by four raters on three dimensions: appropriateness for the audience, rhetorical purpose and structure. Inter-rater reliability on these scores was .40 on average. Individual figures were .619,.243,.116,.375,.536,.451. While these figures are in some cases rather low, they seem to reflect a general difficulty in obtaining reliability on overall ratings for written texts. See Appendix A for a copy of the rating instructions.

[6] As noted earlier, our rating criteria emphasized rhetorical features of the text. We suspect that our experts who received relatively low scores for their texts may have done so because they were not able to adapt a discussion of their job for the young audience in the assignment as effectively as some of the student writers.

[7] The scores are the sum of two ratings on three dimensions: audience, purpose and organization. Inter-rater reliability on the total scores was .807 by the Pearson product moment correlation co-efficient. The rating instructions are in Appendix A.

[8] Inter-coder reliability on the coding was 71.4%.

[9] We performed a median split on the text quality scores to obtain these two groups. As there were seven novices and five experts we would expect one novice to be placed in the "higher scorers" group; in fact three received scores in the top half of the distribution of scores.

[10] When we looked at our writers in terms of expert/novice differences, we did find that on average the experts (i.e., the writing teachers) also had a lower percentage of content planning (51.4%) than did the student writers (73.7%).

[11] These figures were not statistically significant, though the scores for audience approached significance by the Mann-Whitney text ($p = .0631$).

Subject	Total Clauses	Total Planning excluding repetitions	Planning Mode
Experts			
WS	201	88	Extensive
BJ	209	83	Extensive
BS	24	7	Minimal
KC	46	24	Extensive
IB	23	2	Minimal
Novices			
NK	89	44	Extensive
LR	67	21	Extensive
SA	99	38	Extensive
SE	28	11	Minimal
MR	8	4	Minimal
FD	28	11	Minimal
GJ	15	8	Minimal

Table 1. Amount of Planning before Beginning to Write

* Units are clauses.

	Planning Mode	Audience	Purpose	Structure	Total
Experts					
WS	ext.	15	14	12	41
BJ	ext.	14	12	13	39
BS	min.	9	13	13	35
KC	ext.	11	7	9	27
IB	min.	13	10	11	34
Novices					
NK	ext.	12	14	14	40
LR	ext.	8	9	12	29
SA	ext.	12	13	11	36
SE	min.	15	12	9	36
MR	min.	6	6	10	22
FD	min.	14	7	4	25
GJ	min.	4	4	11	19

Table 2. Quality Scores for Texts*

* Scores are the sum of four raters who rated the texts on three dimensions (audience, purpose and structure). Each dimension was rated on a four point scale (1=lowest;4=highest). Highest possible score = 48 ; lowest possible score = 12. Inter-rater reliability on these figures was an average of .4 (highest pair = .619) by the Pearson product moment correlation co-efficient.

	Planning Mode	Audience	Purpose	Structure	Total Protocol	Total Text**
Experts						
WS	ext.	8	8	8	24	41
BJ	ext.	8	6	7	21	39
BS	min.	5	4	5	14	35
KC	ext.	5	4	4	13	27
IB	min.	4	2	2	8	34
Novices						
NK	ext.	8	7	7	22	40
LR	ext.	4	4	6	14	29
SA	ext.	5	4	8	17	36
SE	min.	8	5	5	18	36
MR	min.	2	2	2	6	22
FD	min.	4	4	3	11	25
GJ	min.	2	2	2	6	19

Table 3. Quality Scores for Initial Protocol Excerpts*

* Scores are the sum the scores of two raters who rated the protocols on three dimensions (audience, purpose and structure). Each dimension was rated on a four point scale (1=lowest; 4=highest). Highest possible total score = 24; lowest possible total = 6. Inter-rater reliability on these scores was .807 (on total scores) by Pearson product moment correlation coefficient.

** The breakdown of these total text scores is presented in Table 2. The correlation between total quality scores on the protocols and total quality scores on the text was .874.

Subject	Total*	Topic	Theme**	Form	Audience	Other Goals
High Scorers* **						
WS (Expert)	88	41	5	17	13	18
BJ (Expert)	83	46	3	25	3	9
BS (Expert)	7	3	2	1	2	1
NK (Novice)	44	35	3	4	3	2
SA (Novice)	38	29	1	3	1	4
SE (Novice)	11	5	1	2	1	2
TOTAL	271	159	15	52	23	36
% of total		58.7%	5.5%	19.2%	8.5%	13.3%
Low Scorers						
KC (Expert)	24	13	2	3	6	2
IB (Expert)	2	2	-	-	-	-
LR (Novice)	21	15	-	3	1	2
MR (Novice)	4	3	-	1	-	-
FD (Novice)	11	6	-	1	3	1
GJ (Novice)	8	8	-	-	-	-
TOTAL	70	47	2	8	10	5
% of total		67.1%	2.8%	11.4%	14.3%	7.1%

Table 4. Initial Task Representation: Types of Planning

* Total planning clauses excluding repetitions.

** Clauses coded as theme were also coded in another category so percentages total more than 100%.

*** Subjects with scores in the top half of the distribution.

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APPENDIX A

Rating Instructions for Texts

The attached texts were produced by twelve writers who were given the following assignment:

> Describe your job for a young teenage female audience (ages 13-14). Your text will appear in *Seventeen* Magazine.

As you will see, some of the texts were written by students and some by teachers. We are interested in your judgments about the quality of the texts, independent of whether the writer is a student or a teacher.

Please rate the quality of the texts according to three criteria: audience, purpose and structure. (A more detailed explanation of these criteria is given below.) Each text should receive three scores, each on a four-point scale.

Please consider each of the three ratings on separate passes--that is, rate all the texts for audience, then all the texts for purpose, and then all the texts for structure. Some texts may be good on one dimension, but not on others.

In many cases raters tend to be conservative in their judgments and use only the middle points of the scale. Here we would like you to spread your judgments over the whole range of the scale. (We would really like to make some clear distinctions between the relative quality of these texts on the three rating dimensions.)

Rating Criteria

1. How well is the text adapted for the audience specified in the assignment?

   1 — Not adapted at all for audience
   2
   3
   4 — Very well adapted for audience

2. To what extent does this text have a clear point, focus or rhetorical purpose that goes beyond simply "knowledge-telling" on a topic?

   1 — No clear point/ focus/purpose
   2
   3
   4 — Very clear point/ focus/purpose

3. How well-structured is the text? Consider both overall organization and coherence.

   1 — Not well-structured
   2
   3
   4 — Very well-structured

APPENDIX B

Rating Instructions for Protocol Excerpts

The attached protocol excerpts contain the initial plans (i.e., plans generated before writing a first sentence*) of twelve writers who were given the following assignment:

> Describe your job for a young female teenage audience (ages 13-14).
> Your text will appear in *Seventeen* Magazine.

As you will see, some of the writers were students and some were teachers. In addition, some of our subjects did most of their planning before beginning to write, whereas others did most of their planning during the process of generating a draft. Here we are interested in your judgments about the quality of the planning in these initial protocol excerpts, independent of whether the writer was a student or a teacher.

Please rate the quality of the writers' planning in these protocol excerpts according to three criteria: audience, purpose and structure. (These criteria are explained in more detail below.) Each excerpt should receive three scores, each on a four-point scale.

Please consider each of the three ratings on separate passes -- that is, rate all the excerpts for audience, then all the excerpts for purpose and then all the excerpts for structure. Some of the excerpts may be good on one dimension, but not on others.

In many cases raters tend to be conservative in their judgments and to use only the middle points on the scale. Here we would like you to spread your judgments over the whole range of the scale. (We would really like to make some clear distinctions between the relative quality of the writers' planning on the three rating dimensions.)

Rating Criteria

1. How well does the writer's planning reflect a concern for adapting his/her text for the audience specified in the assignment?

1	2	3	4
No concern with adapting to the audience			Very concerned with adapting to the audience

2. To what extent does the writer's planning reflect a concern with developing a clear point, focus or rhetorical purpose for his/her text that goes beyond simply "knowledge-telling" on a topic?

1	2	3	4
No concern with point/ focus/purpose			Very concerned with point/focus/purpose

3. How far does the writer's planning reflect a concern with structuring the text or fitting a genre?

1	2	3	4
No concern with structure			Very concerned with structure

* Note: These excerpts end at the point where the subjects wrote their first sentence of text. (For the purpose of this analysis, the "first sentence" was defined as the first sentence which the writer built upon to generate a first draft. Sentences which were generated and then immediately rejected were considered "notes" rather than text.)

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